

REMARKS

The first issue raised by the Examiner is that claims 9 and 23 (when dependent upon claims 1 and 15, respectively), and claims 12 and 22-24, are rejected as Indefinite under 35 U.S.C. 112, second paragraph.

By this amendment, claims 1 and 15 have been amended to avoid this issue, by removing reference in these claims to the wording in question, "preferentially allows the passage of protons over other ions".

Claims 12 and 22 have each been split into two separate claims for clarification.

Claims 23 and 24 have been amended to further specify the antecedents in question.

The Examiner is now requested to withdraw this issue.

Claims 1-8, 10, 15 and 21 stand rejected under 35 U.S.C 102(b), as being anticipated by Steward, 5,756,874.

This patent discloses a cell design for processing organic wastes. Undiluted organic waste is fed to a system where it is oxidized using an added metal oxidation catalyst, e.g. cerium, wherein the metal ion is itself reduced. The cell uses a cation exchange membrane to allow proton ions to pass between the anolyte and the catholyte.

It will be appreciated by the Examiner that this disclosure represents a solution to a totally different problem than that to which our claims are addressed. Our claims are directed to an apparatus and method, for the selective oxidation by the active material of the anode of the organics contained in a metal plating solution, without significantly altering the metal

plating solution composition. In particular, in our invention, the metal plating ion remains in its original unreduced state. In order to do this, the anode must selectively break down the organics, leaving the metal ion unaltered. It is therefore essential to our invention that the anode includes an active material, which is stable at acid pH and at high electrical potential, which is neither taught nor suggested by Steward. This is stated in the original claim language, and in itself confers Novelty on all of the rejected claims. See our Specification at page 7, lines 1-9 for support and further explanation.

Further, there is no requirement in Steward for minimizing the loss of metal ions from the anolyte to the catholyte to reduce deposition of the metal ions on the cathode, now specified in our claims. See our Specification at page 7, lines 3-4 for support. It is submitted that this amendment further defines our claimed invention over any possible anticipation by Steward.

Accordingly, the Examiner is requested to withdraw this rejection.

Claims 11-14, 16-20, 22 and 24-29 were rejected under 35 U.S.C. 103(a) as being obvious in view of Steward in view of Downes Jr et al. 5,230,782.

This patent discloses a process to reduce organic content of electroless metal plating solutions in an undivided electrochemical cell, by oxidizing the organic components (typically reducing agents) and reducing the metal ion content. It is emphasized that this patent uses a completely different cell construction, with no separation into anolyte and catholyte compartments by a membrane, its only relevance to our claimed invention is a general disclosure of the unselective reduction of organics in a metal plating solution.

Moreover, there is no teaching or suggestion in the reference of the features mentioned above, which therefore render our claims both novel and unobvious.

In summary, our claimed invention covers an apparatus and process for selectively removing organic contaminants from a metal plating bath in such a way as to allow the plating bath solution to be recycled. This places different constraints on the invention that required inventive solutions not found in the prior art.

- The plating solutions are typically very corrosive, thus feeding them directly into the anode compartment requires special stable anodes.
- Because we want to reuse the solution, we don't want to remove the metal ions from the anolyte, and so the cell membrane must be selected to minimize the loss of metal ions from the anolyte and reaching the cathode where they would be deposited.
- When a cation membrane is used, there is a loss of water from the plating solution being treated due to electroosmotic drag that will result in a changed composition. This is overcome by using a catholyte of lower ionic strength than that of the anolyte to set-up an equal but opposite osmotic water flow.
- Even with the selected cation membranes, a small amount of metal ions will leak across and over extended time result in a deposit on the cathode. Our invention includes claims addressing this issue.

Claim 24 has been combined with claim 18, thus reducing the total number of claims on file to 28.

New claims 30-32 have been added to further define our invention, thus increasing the total number of claims on file by two ie to 31.